REMARKS

I.   Introduction

By the present Amendment, claim 1 has been amended, and claims 5 and 9 cancelled. Accordingly, claims 1-4, 6-8, 10, and 11 remain pending in the application. Claim 1 is independent.

II.   Office Action Summary

In the Office Action of April 9, 2008, claim 1 was rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Claims 1-4, 6-8, 10, and 11 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 6,466,700, issued to Makram-Ebeid in view of with U.S. Patent No. 6,151,417 issued to Florent, and further in view of U.S. Patent No. 6,724,943 issued to Tsuchiya et al. ("Tsuchiya"). These rejections are respectfully traversed.

III.   Rejections under 35 USC §112

Claim 1 was rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Regarding this rejection, the Office Action indicates that it is unclear whether the original image is the same as the input image.

By the present Amendment, Applicants have amended independent claim 1, in part, to address the issues of indefiniteness raised in the Office Action. In particular, the phrase "original image of the input image" has been changed to -- unsharpened image at a corresponding address one line before the input image--.

Withdrawal of this rejection is therefore respectfully requested.

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IV.   Rejections under 35 USC §103

Claims 1-4, 6-8, 10, and 11 were rejected under 35 USC §103(a) as being unpatentable over Makram-Ebeid in view of Florent, and further in view of Tsuchiya.

Regarding this rejection, the Office Action indicates that Makram-Ebeid discloses an image processing device that includes a recursive filtering means for smoothing an input image, and that the recursive filtering means includes edge setting means for setting at least one edge having a predetermined angle from a scanning line direction of the input image. The Office Action further indicates that Makram-Ebeid discloses control means for smoothing the image in correspondence with the edge set by the edge setting means. Florent is relied upon for disclosing a low frequency component compression means for setting the amount of compression of low frequency components of the input image according to the output of the recursive filtering means. The Office Action further cites Tsuchiya for disclosing control means for smoothing the image in correspondence with the edge set by the edge setting means. Applicants respectfully disagree.

As amended, independent claim 1 defines an image processing device that comprises:

> recursive filtering means for smoothing an input image, the recursive filtering means including edge setting means for setting at least one edge having a predetermined angle from a scanning line direction of the input image and control means for smoothing the image to be smoothed in correspondence with the edge set by the edge setting means;
>
> low-frequency component compression means for setting an amount of compression of low-frequency components of the input image according to an output of the recursive filtering means; and
>
> arithmetic means for compressing the low-frequency components of the input image by subtracting an input image which is input frame-by-frame from an unsharpened image at a corresponding address one line before the input image using an

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output of the low-frequency component compression means.

The image processing device of independent claim 1 includes recursive filtering means for smoothing an input image. The recursive filtering means also includes edge setting means for setting at least one edge having a predetermined angle from a scanning line direction of the input image. The recursive filtering means also includes control means for smoothing the image in accordance with the edge set by the edge setting means. A low frequency compression means is provided for setting an amount of compression for the low frequency components of the input image according to an output of the recursive filtering means. The image processing device also includes an arithmetic means for compressing the low frequency components of the input image by subtracting an image which is input frame-by-frame from an unsharpened image at a corresponding address one line before the input image, using an output of the low frequency component compression means.

As discussed in the Specification, the images are input frame-by-frame, and a value of zero is set in all the addresses in the memory line prior to input of the image. The arithmetic means subtracts image data stored in the line memory at the corresponding address one line before image data stored in the current line memory in order to obtain a difference value. This difference value is subsequently output to the lookup table. See paragraph [0026] of the published application. According to such an arrangement, the recursive filtering means is capable of extracting low frequency components of the input image with a delay that corresponds to only one line of the input image. Accordingly, the dynamic range compression processing has

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only a short delay, and can be performed in real time with minimal computational overhead.

The Office Action alleges that Makram-Ebeid discloses various features of the claimed invention. This does not appear to be the case. Makram-Ebeid discloses an image processing method for preserving the edges of objects and for reducing noise. An intensity image is acquired in the form of a multi-dimensional matrix of points, and an intensity gradient is determined at each point. The intensity gradient is determined by its direction and modulus. A recursive spatial filter having an anisotropic kernel and smoothing function that is greater in the direction perpendicular to the direction of the gradient than in the direction of the intensity gradient is passed at each point. See Abstract. Makram-Ebeid also indicates that the spatial recursive filtering function performs smoothing of the intensity to a higher degree in the direction perpendicular to the discretized intensity gradient direction relating to this voxel than in the discretized gradient direction. Accordingly, an impulse response is produced that is much wider in the <u>direction perpendicular to the gradient vector</u> than in the direction of the gradient vector. See column 8, lines 26-40. Makram-Ebeid is completely silent on performing the smoothing process in parallel with line-by-line scanning of the image, as now recited in independent claim 1. Furthermore, Florent and Tsuchiya also appear to be silent on this particular feature. Accordingly, even if properly combined, the cited references will fail to disclose or suggest features recited in independent claim 1, such as:

> arithmetic means for compressing the low-frequency components of the input image by subtracting an input image which is input frame-by-frame from an unsharpened image at a corresponding address one line before the input image using an output of the low-frequency component compression means.

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It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2-4, 6-8, 10, and 11 depend from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

V.   Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

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AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 1295.44668X00).

Respectfully submitted,
ANTONELLI, TERRY, STOUT & KRAUS, LLP.

Leonid D. Thenor
Registration No. 39,397

LDT/vvr
1300 N. Seventeenth Street
Suite 1800
Arlington, Virginia 22209
Tel: 703-312-6600
Fax: 703-312-6666

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